Chapter 3

ATM, Internet Banking and Mobile Banking Services
-An Overview-
CHAPTER 3

ATM, INTERNET BANKING AND MOBILE BANKING SERVICES – AN OVERVIEW

Chapter two provided a detailed literature review on the IT, computerization, CBS and E-banking services and with specific reference to E-banking Alternative Delivery channels (ADCs) namely ATM, IB and MB services. This chapter provides an overview on the selected E-banking services viz. ATM, IB and MB services.

3.1 ATM

The evolution of e-banking started from the use of ATM, telephone banking (tele-banking), direct bill payment, EFT and online banking (Safeena, et al., 2010; Kass R., 1994). One of the major technology and self-service driven channels in the Indian banking industry is ATM freestanding machine, which a customer can use with his card to get cash, information and other services. It is an electronic machine, which is linked to the customer accounts and banks’ records. Banks have delivered exceptional customer convenience deploying ATMs. On most modern ATMs, the customer is identified by inserting a plastic ATM card with a magnetic stripe or a plastic smart-card with a chip that contains a unique card number and some security information. Authentication is provided by the customer by entering a PIN (Joshua A.J., 2009).

3.1.1 Evolution

The invention of ‘ATM’ is a milestone that we have achieved in the banking industry. In 1939, Luther George Simijian invented a cash dispenser and it was first established by the City bank of New York. In 1960 Scot John Shepherd-Barron invented the first ATM Machine. Barclays bank in London was the first to deploy an ATM in 1967. Since the mid 1970s ATM gradually emerged as a
powerful channel of service delivery in West Europe and North America (Sudipkar Purkayastha, 2010). The early versions of the ATM were restricted to cash withdrawal only. In the 1967 model, patented by Shepherd-Barron, the plastic cards did not exist and instead of that ‘vouchers’ with a strip of radioactive substance were used for withdrawing cash. Consequently, the vouchers were matched with a particular personal PIN number used by the bank to identify the customer.

Another co-patent to the invention of the ATM was Don Wetzel. Though the conceptualisation began in 1968, the patent was issued only in 1973. This cash dispenser was first used by the New York based bank namely, the Chemical bank. As was the case with the ATMs during those years, they were hardly multi-functional units. Moreover, they were not based on any electronic system. Hence, the debit cards, distinct from credit cards, were given to only selective clients with good track records. Thus, the service itself took a stronghold only in 1970s. In India, Hong Kong and Shanghai bank was the first bank introduced ATM in Mumbai in 1987. Secondly Citi bank introduced ATM in 1988 (Joshua A.J., 2009; IBA Correspondent, 2006). Stand-alone ATMs made their appearance first in India, in the early 1990s. Easing of restrictions on the location of ATMs has made them being installed at convenient places such as airports, business centres, railway stations, bazaars, hospitals, etc.

At end March 2011, PSBs owned 49,487 ATMs of which 29,795 are On-site ATMs and 9,692 are Off-site ATMs whereas PRSBs owned 23,651 ATMs of which 10,648 are On-site ATMs and 13,003 are Off-site ATMs. Foreign banks owned 1,367 ATMs of which 286 are On-site ATMs and 1,081 are Off-site ATMs. Further, introduction of ATMs enabled customers to do banking without visiting the bank branch in person. In 2010-11 the number of ATMs witnessed a growth of 24 per cent over the previous year. However, the percentage of Off-site ATMs to total ATMs witnessed a marginal decline to 45.3 per cent in 2010-11 from 45.7 per cent in 2009-10. More than 65 per cent of the total ATMs belonged to the PSBs at end March 2011 (RBI, 2010-11). This trend infers that the significance, features and benefits of ATMs have been recognized by Indian customers optimally (Mittal R.K., et al., 2006-2007).
The banking industry witnessed the growth of ATMs and gradually emerging as banks get hooked to a service provider’s switch under one brand umbrella ‘SPNS’ to provide enhanced network of ATMs to their customers. Cash Net of Euro net, Cash Tree of Bank of India and member banks, National Financial Switch (NFS) of IDRBT are a few examples of the emerging new trend in the expansion of ATM networks. By becoming members of these dedicated networks they can facilitate their customers to access worldwide ATM network, 24x7 at a nominal fee (Srinivasan H.S., et al., 2005)

3.1.2 Concept

ATM, a cash machine helps cardholders to perform routine banking transactions by the way of electronic means conveniently, speedily, efficiently and safely with high secured manner with use of PIN number and ATM card.

3.1.3 Types of ATM

ATMs are of following types:

**Lobby ATMs:** These are installed in branch lobbies of the bank concerned. Most of them are owned by concerned bank.

**Wall ATMs:** These are installed in wide range of locations spread over the country/overseas in busy areas which are convenient to customers to access ATMs easily. Most of them are owned by bank concerned.

**White-label ATMs (WLAs):** RBI has allowed non-banking companies to deploy white-label ATMs to expand their reach in rural India. Any customer with an ATM card can access white-label ATMs. However, the RBI norms allowing five free transactions at ATM will not be applicable at these ATMs. Despite the non-banking company are not allowed to charge a customer directly for the transactions, the costs are expected to be displayed upfront on the screen. It is likely that the bank may recover the transaction charges from the customer separately. As of now, many companies, such as Muthoot Finance and Prizm Payments, have shown interest in setting up these types of ATMs. Worldwide, white-label ATMs are in use in Canada and in some African and European countries. (http://economictimes.indiatimes.com/topic/automated-teller-machines).
3.1.4 **Operation Lines**

These refer to computerized connection across a data communications line made between the ATM and the bank's central computer. Central computer uses for the authorisation process.

**Types of Operations**

**On-line:** ATM is installed within the bank's premises. It ensures that the daily cash withdrawal limit is maintained; prevents ATM from cashless; helps the bankers to cash too quickly; ensures customers the availability of funds in their accounts to bear the transactions. If the funds not available in accounts, a borrowing facility is also existed to withdraw cash. Thus, it enables bankers to provide wider range of functions to customers.

**Off-line:** ATM is installed out of the bank's premises i.e. At various mass attracting and convenient places so as to enable majority of the customers to access. These are resulted in misuse and improper use of the ATM card. RBI has granted general permission to install Off-site ATMs with effect from June 12, 2009, subject to reporting, without having the need to take permission from RBI in each case subject to any direction which RBI may issue in future (Anonymous, 2009; Sudipkar Purkayastha, 2010).

3.1.5 **Shared Payment Network Systems (SPNS)**

SPNS means getting together of a clutch of banks, with a common switch, where any bank’s ATM card can be used to access accounts from any of the ATMs in that group of banks. This has been aroused in ATM technology with the objective of increasing inter-bank card usage round the clock throughout an year across globe by electronic means. The various SPNS are SWADHAN, Cashnet, Cashtree, Mitr, BANCS, INFINET, NFSN, Corporation Bank Network, SBI Network, etc. SPNS provides all the services that are available through ATMs owned by member banks to customers. Each member bank shares the benefits of an ATM of other banks for the benefit of its customers in the form of ‘Shared ATMs’. With the prices coming down, it would be in the interest of one and all of the Indian banks – big and small, join hands with each other so as to reach a higher penetration level of ATMs in the country (Santosh Patnaik, 2004; Udeshi K.J., 2005).
3.1.6 Bio-ATM

In India, a Pune based Technology Company, Axis software has developed Bio-ATM for banks and financial institutions which leverage sophisticated biometric technology to allow secured ATM transactions. The Bio-ATM provides an alternative to the regular card and PIN based ATM transactions system (Gunasekaran K., et al., 2009). ATMs are connected to a bank’s Centralised Electronic Financial Transaction switch with biometric support such as fingerprint verification, etc. Biometrics establishes identification via face, voice, retina or iris. This eliminates the need for PIN entry and instead, works on authenticating customer thumb impressions. There is a simple menu, along with audio guidance in regional languages to enable easy usage even in rural areas. Moreover, even an uneducated person can withdraw cash using such biometric ATMs (Pak Halan, 2007; Devaprakash R., 2008). IT enabled cards facilitate transactions with biometric enablement. They avoid hidden costs of ATM card management like card personalisation, delivery management, re-issuance, PIN generation and help desk. They are ideal for Indian rural masses. They are accurate (Swati Anand et al., 2009).

3.1.7 Rural ATM

Rural ATMs provide specific benefits in terms of low capital cost, biometric mode of authentication and compatibility with KCC, magnetic stripe card and smart-card based technologies. The deployment of rural ATM will help in lowering the cost of transaction and carrying out banking from non-branch locations. The services can be carried out through rural ATMs are cash deposit, cash withdrawal, payment of utility bills, insurance premium payments, collection of loan emis and account information viz. Balance inquiry, mini statement, product information, etc. (Bhasin T. M., 2007). Rural ATMs have the ability to handle used and soiled currently notes. Sensors are used to detect and correct false dispensation. They have got smart-card based identification, biometric authentication, encrypted secure communication over the internet and real time online communication for “anywhere banking”. The most efficient and cost-effective way to do this is by setting up of ATMs in MB units or, ‘Bank-on-Wheels’ (Swati Anand et al., 2009).
3.1.8 Mobile ATM

The Bank-on-Wheels would carry a rural ATM from village to village. It will be deployed in rural communities to eliminate the need for customers to travel long distances to conduct their day-to-day banking (Swati Anand et al., 2009). The main objective of ATMs such as anywhere and anytime may not be fulfilled through Mobile ATMs, if they are on mobile vans. Instead of that they may be installed for few days at Exhibitions, Book-fairs, Long run festivals, Long duration sports events like Olympic Games, Asian Federation Games, Commonwealth Games etc. (Hemant Kaul, 2006). In the Indian banking sector, Bank of India has installed first mobile ATM in India.

3.1.9 Services

The ATM with the use of plastic magnetic stripe card viz. Credit card, debit card, ATM-cum-debit card (Prashantha C., et al., 2008) and PIN number offers several value-added services as to enabling customers to avail them. They are cash withdrawals, funds transfer, Internet pack service, cash advance against credit cards, cash/cheque deposit, handling deposits and enquiries, arranging loans and insurance, buying and selling of stocks and advice customers on different savings and investment schemes (Manoharan B., 2007; Joshua A.J., et al., 2009), registering request for issue of cheque books, obtaining statement of account of last six / ten transactions, viewing the balance in the designated account, updating passbooks, obtaining transaction receipt indicating the balance, paying utility bills, booking for tickets, recharging mobiles, paying credit card bills, procuring calling cards, paying fees and taxes, making donations, paying subscriptions, paying gas bills, making deal in mutual funds, changing the ATM PIN, making a request for Net banking password, and viewing headlines of news, stock quotes, horoscope, sports, weather and movies running in theatres, etc. (Tareque Laskar, 2006).

3.1.10 Mechanism

Customer accesses the ATM Lobby with ATM card and PIN number at his convenience on his requirement. Customer swipes out or inserts the card either horizontally or vertically depending on the position of the access lock. As and when
the green light glows, pushes the door gently and moves into the ATM enclosure within few seconds. Customer inserts the card into the ATM at the slot indicated. If the ATM is a dip card ATM, customer dips the card in the slot and takes it back. The various language options are available. The cardholder chooses from the touchscreen, the language in which to proceed further. The ATM will prompt the customer to key in the PIN. After the PIN input is over, the ATM processes the information and if it is found correct, guides customer step by step for conducting transactions. If wrong PIN is entered thrice, the card will be rejected for the rest of the day. Options appear on the screen and customer chooses the appropriate facility option. Some of the ATMs may have a maximum cash dispensing limit per transaction. In case the amount sought to withdraw is greater than the maximum cash-dispensing limit, multiple transactions up to the overall daily limit may be done. On no further transactions, the card is to be collected from the machine within 30 seconds from the moment of ejection. If failed, it will be retained by the ATM in case of dip ATMs. In such an event, the ATM linked branch or the card issuing branch (not applicable for dip card ATM) to be contacted. In case of dip card ATMs, it is required to dip the card and input PIN for each transaction. Customer can also use debit card, ATM-cum-debit card (e.g., in case of State Bank of India, State Bank Cash Plus Maestro Debit card), credit card etc. At ATMs which are part of the Master Card network in India (www.sbi.com).

3.1.11 Plastic Money

Plastic Card Currency is another convenient electronic mode of payment. Different types of plastic money available now are debit card, ATM-cum-debit card, credit card, charge card, co-branded card, add on cards, etc. The consumers tend to benefit from the facilities of convenience and credit which plastic offers.

Credit Cards

E-banking was instituted in the mid-1960s to facilitate the execution of financial transactions using credit cards which is the modern system of payment. This service was followed in the early 1970s by the deployment of ATMs. First own credit card launched by a bank is “Centralcard” in 1980 (Daruwalla H.A., 2007). In order to avoid the sufferings of the customer, the credit card system is
introduced by the banking institutions. Due to the popularity of this service among consumers, the retailers rapidly came to accept them on an almost universal basis (Michel Benaroch et al., 2000). The credit card business is a fast growing segment of banking in these days (Ramalingam P., 2009).

Visa and Master Card are associations of banks which deal in credit cards (Swati Anand, et at al., 2009). RBI has permitted banks to issue international credit cards to resident Indians (RBI, 2003-04). Credit cards as a method of payment without the use of cash or cheque is gradually giving way to improved versions such as debit cards, smart cards, co-branched cards, etc. (Munusamy K., 2010). The volume and value of transactions with credit card recorded a growth of 13 per cent and 22 per cent, respectively in 2010-11. New PRSBs and foreign banks accounted for more than 80 % of the total outstanding credit cards as at end March 2011 (RBI, 2010-11).

**ATM Card and ATM-cum-Debit Card**

The Debit Card was introduced in December 2001 (Daruwalla H.A., 2007). Many users surrendered credit cards (Savita Trivedi et al., 2010). ATM cards are Plastic Cards. They got the first rank followed by online banking, e-payments, MB and Tele-banking respectively (Uppal R.K., 2010). Cards have logo of card-issuing bank and of the network. They are containing name of the customer, date of issue/month of issue of the card, magnetic stripes (containing encoded information) and space for signature. During 2010-11, the number of debit cards grew at the rate of 25 per cent over the previous year. Nearly three fourths of the total debit cards were issued by PSBs as at end March 2011. The share of PSBs in outstanding debit cards witnessed an increase during the recent years. However, in absolute terms, the number of outstanding debit cards witnessed an increase for new PRSBs during the recent years (RBI, 2010-11).

3.1.12 **ATM PIN**

ATM PIN is essentially a Personal Identification Number. A confidential number that allows customers to access their account at ATMs to avail various facilities offered through it by banks. It is a four digit code number. It
authenticates and authorises the use of the ATM facility by a customer. Once PIN number entered in the system it will be encrypted but no decryption takes place anywhere in the system. Cardholder may use the PIN change option available at networked ATMs. The PIN has to be kept secret by the customer, to prevent any misuse or fraudulent transactions in the event of loss of the card (www.rbi.org.in).

3.1.13 Cash Withdrawal Limits, Service Charges and Usage Fees

Banks set limit for cash withdrawal by customers. This limit is displayed at ATMs. This may vary from bank to bank. Present service charges are in force with effect from 15th October 2009. For cash withdrawals at own bank ATMs the limit is fixed per day and it is displayed in ATM lobbies. E.g., in respect of SBI the daily limit is Rs. 40,000 and for smart card is Rs. 50,000. For cash withdrawals at other bank ATMs, banks have decided to maintain a limit for withdrawal of Rs. 10,000/- per transaction and maximum of five such transactions per month to withdraw freely without any charge. When the limit exceeds beyond this limit, for every withdrawal, charges will be levied to the tune of Rs. 20 as per instructions displayed at ATM lobbies. No charges are payable for using other banks' ATM for balance enquiry and to view account balances. Banks levy service charge for card either quarterly (or) half-yearly (or) annually and it varies from bank to bank. The instructions are being issued by banker to customer as and when it is altered. Service charges vary for domestic cards and International cards.

3.1.14 Benefits to Customers (Cardholders)

ATM makes customers to access their accounts easily, conveniently, speedily, at anytime, anywhere, at any bank’s ATM round the clock 365 days a year at low cost at global level. Customers can avail all facilities of ATMs. Privacy in transaction is secured. The transactions are free from errors and risks. They enjoy the benefit of less crowding at ATMs. It is rare to find long queues in the banks as transactions like cash withdrawals are done through ATMs. Customers have been provided with flexibility in cash withdrawals. It ensures safety and security. Cash carry risk is reduced.
3.1.15 Benefits to Banks

Banks are at free to install ATMs at the places based on their own decision and as they feel convenience to their customers. ATM reduces branch cost. It increases volume and number of transactions per day. It enhances customer satisfaction. It raises the Customer base. It reduces man-power. It helps banks to retain the existing customers and to gain new customers. It helps banker to encompass more areas of banking for business purposes. It helps to expand and diversify the banking operations. It gives a cutting edge to ensure effective delivery of virtual banking and financial services. It helps to extend operating base and gives it a real competitive edge over its rivals. It reduces the pressure on branches for undertaking routine transactions. It reduces the transaction cost and cost of operations. It increases market penetration. They enjoy the benefit of maximum ATMs with minimum investment. It serves as a permanent fixture in the virtual banking world. Investments are optimized. It provides settlement reports necessary for arriving at inter-bank settlement. Banks need not invest huge capital on infrastructure and spend money on maintaining this vast network. Effective utilisation of the investment made in ATMs is experienced. It increases inter-bank card usage. It Increases the average transaction per ATM Machine per day. It results in major risk-mitigation measure. Improved centralised control ensures ongoing compatibility with national and international standards and systems. Enhanced direct customer service is assured.

3.1.16 RBI’s Guidelines

The Reserve Bank in May 2011 advised banks to improve their operational efficiency of ATMs to customers; to reduce the time limit for resolution of customer complaints from 12 working days to seven working days from the date of receipt of the customer complaint; To entitle customer to receive compensation for delay at the rate of Rs. 100 per day, provided the complaint is lodged with the issuing bank within 30 days from the date of the transaction; to settle all disputes regarding ATM-failed transactions by the issuing bank and acquiring bank only through the ATM system provider leaving no scope of bilateral settlement arrangement outside the dispute resolution mechanism of the system provider. This measure would bring down the instances of disputes in payment of compensation between the issuing and acquiring banks (RBI, 2010-11).
3.1.17 Safety Guidelines

A study suggests that the technological mechanisms like designated time, microchip technology, biometric tokens, enhanced security, ATM monitoring, customized software, customer motivation, alerts etc can be used to minimize and prevent ATM frauds in India (Amit Kumar Chaturdevi et al., 2009). Careless handling of a bankcard can result in fraudulent charges on a customer account. Similarly, negligent use of an ATM card can result in an imposter gaining access to a customer accounts.

RBI has advised banks to put in place a system of online alerts latest by June 30, 2011 to cardholders, for all types of transactions. Further, banks have been also advised to provide complaint templates at all ATM sites for lodging ATM-related complaints (RBI, 2010-11). Banks may make use of multiple channels (e.g. Banks websites, alert messages on customer’s mobile phone, messages printed on customer statements, promotional leaflets, circumstances when bank’s frontline staff communicate with their customers) to enforce precautionary measures. The internal procedures of the card-issuing bank are safe and sound. This prevents fraud and financial losses. The internal working of the card-issuing bank is identified through confidential keys called ‘algorithm’, which are known to the key banking personnel. While ATMs are used, ATM customers are required to adopt the following practices in order to ensure security in their ATM transactions and personal information.

3.1.17.1 As regards pin & card

PIN and ATM card should be protected as hard cash in the safe custody. Both ATM Card and PIN are not to be kept together. PIN to be kept as a secret. PIN should not to be written on the card or at a place where it can be discovered. Information regarding ATM card or PIN are not to be disclosed to anyone. ATM card is not to be lent to anyone. PIN is not to be revealed to any person. Old cards are to be cut across account number and disposed off. Only the required card shall be carried to ATMs but not many. As soon as received, the backside of new cards shall be signed in the space provided for the purpose. A record of card numbers, their expiration dates, the phone number and address of each bank should be kept. The details and informations about card and bank should be kept in a secured place.
Frequently used digits/letters namely birth date, phone number, house numbers etc. May not be used to coin PIN. PIN shall be memorized. PIN to be changed frequently, at least once a month. PIN mailer should be destroyed. If a card is being accepted at merchant establishments without the use of PIN, the matter should be taken to bank and to be ensured that the card does not work without PIN. Card should not be exposed to direct sunlight, magnetic fields, x rays etc. Photocopy of both the front and back of all credit cards are to be kept in order to facilitate the immediate cancellation of the card if lost or stolen.

3.1.17.2 As regards Withdrawals

It is to be remembered not to leave card at the ATM. The cash is to be collected within 30 seconds from the time of cash coming out of ATM cash slot, to avoid the cash getting back into the ATM. The transaction slips are not to be thrown in the ATM or outside. It should be torn and destroyed properly. If ATM transaction is incorrectly reported on a receipt or statement, it should be promptly notified to the bank. One should not be to be distracted while carrying out transaction. Assistance may not be accepted from unknown persons while using an ATM. Cash should not be displayed and it should be kept in pocket immediately and the cash shall be counted later when in the safety place.

3.1.17.3 As regards ATM

Customer should not permit unknown person along with him to enter ATM lobby. Once entered inside the vestibule, it should be ensured that the door is completely closed behind him. ATMs that are familiar or that are in well-lit locations where one feels comfortable shall be used. If the machine is poorly lit or is in a hidden area, another ATM may be used. Card is to be kept ready before approaching the ATM. Searching and finding the card are to be avoided inside Lobby. If, ATM appears to have been tampered with or otherwise altered, it should not be used. Such conditions are to be reported to the bank. Card numbers, PIN numbers or passwords are not to be kept in the wallet or purse. ATM that is well lighted and monitored by a surveillance camera or a security guard shall be chosen. Time at the ATM shall be minimized. While entering PIN the keypad shall be shielded. If the ATM swallows the card PIN should not be re-entered. The bank is to
be contacted immediately. Attention to be paid before using machine. If something appears unusual or unfamiliar, another ATM shall be used. An ATM, which looks suspicious, shall be avoided. Others are not to be allowed to enter the ATM room during transaction. The ATMs are not to be used that have messages or signs fixed to them indicating that the screen directions have been changed, especially if the message is posted over the card reader. ATM card is not to be inserted into an ATM machine that obscenely placed or into one with a card slot protruding from the face of the machine. After the transaction is over and also after ensuring that welcome sign is there on the screen, the card shall be collected before leaving the ATM.

3.1.17.4 As regards surroundings

While making transactions one should be aware of surroundings. Before proceeding with transaction, one should guard against surveillance by anyone who may arouse your slightest suspicion. If it is suspected something is not quite right, trust the instincts. Use another ATM or a bank branch where it is felt more comfortable. If possible, a machine that is located in a bank location may be used. Any suspicious activities or crimes are to be reported immediately to both the bank and police. If anything suspicious is seen, immediately transaction shall be cancelled and shall be vacated the place. As soon as possible it is to be confirmed with bank that the transaction was indeed cancelled. At a drive-up ATM, it should be ensured that the car is locked and keys have been taken with. If there are any suspicious looking individuals in the vicinity of ATM, particularly if it is after sunset are to be reported to bank or police immediately. At night, it is to be ensured that the facility (including the parking area and walkways) is well lighted. If any problem is observed, another ATM may be used. Before vacating ATM lobby it should be ensured that the card and cash are pocketed.

3.1.17.5 As regards loss/theft of card

One should know that the loss, theft, or unauthorised use of card or PIN will expose risks. These have to be reported to bank without any loss of time. Once the theft is discovered, it must be reported to the police, account to be closed, a new account to be opened and new bank cards shall be obtained. If there is any false transactions made in the account by anyone else, to be reported immediately to the
bank. Use the special telephone number listed on their billing statements for the purpose. Don’t forget to follow up phone call with a letter (Rajendran V., 2007).

3.1.17.6 As regards other miscellaneous activities

Always a statement of the transaction may be obtained and the entries may be reconciled with the individual accounts. If there is any defect, the bank shall be immediately contacted. Always ATM or debit card transactions are to be saved before entering PIN or before signing the receipt. A blank charge or debit slip should not be signed on. A line shall be drawn through blank spaces on charge or debit slips above the total when card and receipts are signed so that amount cannot be changed. Carbons are to be torn out and receipts are to be saved to check against monthly statements. It is to be ensured that the card is swiped in one’s presence (Khanna P.K., 2006; Ramachandra B.S., 2007; Vijay Dube, 2005; Upadhyaya A.K., 2007).

There is another concern for ATM card holders. In ATM, additional devices are fitted to read card details. Once fitted, the equipment looks like a part of the ATM. When card is used, it captures card details. A camera is hidden in this holder, which records PIN when it is in use. The criminals, sitting in a car or a place near to the ATM will be able to trace the details. Once they have the details, it becomes easy for them to make duplicate ATM card and to use it at ATM or merchant establishment. So, before using the card, check for any additional attachments on the ATM. There are some ATMs, (Die Bold ATMs) where the card remains inside the ATM till all our transactions are complete. We can do multiple transactions without any need to input PIN for every transaction. If we are operating such an ATM, we should ensure that we properly exit and collect back our card. In our hurry if we collect cash and leave the place, the next person can continue the transaction and withdraw/transfer money from our account (Ramachandra B.S., 2007).

3.1.17.7 As regards skimming of cards

While using credit cards, a constant eye is to be kept on the card and the one handling it. One should be aware of the-sweep and theft scam using card skimmers. A skimmer is a machine that records the information from the magnetic stripe on a credit card. It may be downloaded onto a personal computer later. The
card can be swiped on a skimmer by a dishonest person and that data can then be used to make duplicate copies of the credit card. Therefore card holder should be double cautious while using cards in the skimmer.

3.2 INTERNET BANKING

In the late 19th century, modern banking system was introduced into the Islamic countries at a time when they were politically and economically at low ebb. Although now it is in its nascent stage, there are huge prospects for the online banking system in those countries (Suman Lodh, et al., 2008).

IT influences the organizations in other ways, such as, changing the decision structure of banks (Nagaraju Y., 2008) to have better deal with the competition. Today, banks are gradually moving towards web-based banking as it is cost efficient and more convenient for the customers. The PSBs commanding a major market share of customers were lagging far behind in providing IB (Nidhi Choudhari, 2009). The Internet is transforming the banking and financial industry in terms of the nature of core products and services and the way these are packaged, proposed, delivered and consumed (Nagaraju Y., 2008; Gupta M.K, 2001; Selvakumar M., et al., 2010).

3.2.1 Internet in Service Sectors

In 1969, the Internet, a best channel, one of the most important innovations was first launched by Vicent Cerf, the father of Internet. In the early 1990s, with the introduction of the first browser, the Internet became “friendly” enough to begin to be used by the general public (Zimmerman AB, 1997). In the early 1990’s corporations began to realise the Internet’s commercial potential (AT&T Technology, 1995). Suddenly the barriers of time and distance were minimized. Today, the Internet has become as an ideal medium for delivery of banking products and services. The future seems unlimited.

The advent of the Internet accompanied by the growth of related technologies has created a significant impact on the lives of people around the globe. The Internet is inherently a bidirectional medium (Roland T. Rust et al., 2001) for fastest global communications (Sakthivel N., et al., 2009-10; Bansal A.K.). It is
becoming as a primary source of development for various business organizations and service sector industry (Gupta M.K, 2001; Selvakumar M., et al., 2010; Aravazhi Irissappane D., 2004). It has emerged as an important medium for delivery of banking products and services (Swati Anand, et al., 2009).

3.2.2 Internet Penetration

The Gartner India has observed that India has recorded highest Internet user growth in the Asia and Pacific region and is 5th largest Internet user in this area. The declining Internet rates, falling PC prices, more local content availability, start of broadband width access through cable and digital subscriber lines are the main drivers of this growth (Bhasin T.M., 2001). According to Miniwatts Marketing Group, as of November 2007, 1.262 billion or 19 per cent of the world population have access to the internet. North America leads the internet penetration though Asia has the largest number of total internet users (462 million) (Balaraju K., et al., 2008).

3.2.3 Emerging Challenges in the Financial Institutions

The Emerging Challenges in the Financial Institutions are demand side pressure due to increasing access to low cost electronic services, emergence of open standards for banking functionality, growing customer awareness on need of transparency, global players in the fray, close integration of bank services with web based E-commerce or even disintermediation of services through direct electronic payments (E-cash), more convenient international transactions due to the fact that the Internet along with general deregulation trends, elimination of geographic boundaries and move from one ‘stop shopping’ to ‘Banking Portfolio’ i.e., unbundled product purchases (Mishra A.K., 2005)

3.2.4 What is Internet Banking?

Cyber banking or IB or online banking, the fastest growing application of the Internet (Malmarugan D., 2009) is a new modernized delivery channel that enables banks for the distribution of financial products including wholesale products for corporate customers as well as retail and fiduciary products for consumers and services through the Internet (Balaraju K., et al., 2008; Ravikumar V.V., 2007-
2008). It is the backbone of electronic communication (Ramachandra Rao Gurram, 2003). It is the World Wide Web infrastructure using personal computer (PC) or other intelligent devices (Ashutosh Saxena, 2003; Ravi V., et al., 2007). Banks are working with use of their Internet platforms to sell a larger variety of products. “Through the net, customers can find out more about the product”, explains Phau. (file://G:\shankar4.html, 2004).

IT has in fact emerged as mainstream product (Naresh Sharma, 2003; Sudipkar Purkayastha, 2010) and therefore the ability of banks to competitively differentiate their offerings stands restricted. IB has gained worldwide acceptance as a new delivery channel for performing various banking transactions. It provides the opportunity to the customers to conduct banking transactions at their convenience (Ashok Singh, 2010; Savita Trivedi, et al., 2010). IB has turned out to be the nucleus issue of various studies all over the world. The efficacy or confidence to use IB may affect an individual’s attitude and thereby his intention to use IB (Prema C., et al., 2010)

3.2.4.1 Evolution

In 1990 Tim Berners-Lee created the first World Web server and browser. Starting from the mid 1990s, banks were required to undergo successive technology transformations in a tearing hurry (Sudipkar Purkayastha, 2010). With apologies to Winston Churchill, it is appropriate to say that the first phase of the new era of IB was ended when Security First Net Bank (SFNB), now owned by Royal Bank of Canada launched the world’s first Internet bank in the fall of 1995 (Bill Orr, 1998). It was the first bank to make its services available on the World Wide Web. It started its services on 18th October 1995. IB customer can access his account with use of a PC, telephone link, a modem and arrangement with one of the internet service provider (Munusamy K., 2010; Bhasin T.M., 2001; Ravi Nath, et al., 2001).

X.com Bank, the first bank operating in a “Silicon Valley culture” was a startup bank with no foundation in the banking industry, represented the kind of threat, brick-and-mortar banks were facing from Internet only e-banks (Lewis, et al., 2000). In deciding their future course of actions, banks may gain by drawing on the
experience of US banks. Significantly, net banking has been in place for the longest period in USA. Having been invented in the 1980s, it was the Well Fargo Bank, which was one of the pioneers to offer IB to customers as a usable delivery channel in the year 1995. In USA, it has been in extensive use amongst bank customers, particularly in checking accounts. It is estimated that 90 percent of all bank customers, today have access to some IB product (Sudipkar Purkayastha, 2010).

The evolution of IB in the country has traversed three stages so far. In the first stage the banks had, a brochure-ware level presence, dispensing with information about their organizations, products and services. In the second stage, they introduced some interactive and a few transactional capabilities supplementing the information content. The customers could view their accounts; enquire about transactions; print account statements. In the third and the present stage of evolution, banks offer a much wider range of transactional feature which includes the presently available services like funds transfer between accounts (own and third party).

The credit for pioneering this channel goes to ICICI Bank, which introduced the country to net banking in 1997. Established in 1994, ICICI Bank is today, the second largest bank in India and among the top 150 in the world. In less than a decade, the bank has become a universal bank offering a well diversified portfolio of financial services. In the initial years, the new PRSBs provided leadership. The PSBs entered the space later. Interestingly, foreign banks, many of them global leaders are more experienced in net banking (Sudipkar Purkayastha, 2010).

The significance of the Internet, today’s competitiveness and increasingly global banking environment are being widely acknowledged (Thornton J., et al., 2001). Internet is no longer a medium of communication, but it is a strong business medium. Since 1980s, commercial banks have continuously innovated the enhanced products and services particularly in the developed countries (Suman Lodh, et al., 2008).

3.2.4.2 Objectives

According to Carlson et al., (2001) and Centeno (2003) the objectives to adopt the IB are:
From Banker’s View

They are to reduce operating cost (to set up an Internet bank it requires $6 mn compared to $25-$30 mn for a brick and mortar bank in USA); to enhance customer reach; to enable business diversification such as providing non-financial services (because of the competition or customer demand); to increase volume of business; to provide better products and services; to form alliances with other industries; to retain market share by implementing online (real-time) facilities.

From Customers’ Point of View

To avail anytime and anywhere banking, 24 hours a day and 365 days a year from locations where the Internet access is available; to have better control of banking transactions (Suman Lodh et al., 2008).

3.2.4.3 Licensing policy

Any bank offering IB services has to first obtain the approval of the RBI (Amit Kumar Chaturdevi, et al., 2009). With extensive participation of banks from all sectors, net banking has now emerged as a common e-delivery channel in the industry (Sudipkar Purkayastha, 2010).

3.2.4.4 Two ways to offer Internet banking

There are two ways to offer IB. First, an existing bank with physical offices can establish a website and offer IB in addition to its traditional delivery channels. Second, a bank may be established as a “branchless”, “Internet only” or “virtual” bank (Pooja Malhotra et al., 2006)

With the IB, the brick and mortar structure of the traditional banking gets covered into a click and portal model thereby giving a concept of virtual banking a real shape. Such arrangements are not only cost-effective, but also make for quick transfer of money and goods (Gupta M.K., 2001).
3.2.4.5 Services

**Informational:** IB offers information about the bank’s products and services ("brochureware") and there is only low risk.

**Communicative:** IB offers account-related information and possibly offers updates to static data (such as addresses). Since access is permitted to the banks main systems, the risk is material. The features are registration for account statements by email either daily/weekly/fortnightly/monthly basis, stop payment of cheque, cheque book replenishment, Demand Draft/Pay-order, opening of fixed deposit account, opening of letter of credit and efforts as all the MIS is available at the click of the mouse etc.

**Transactional:** IB allows customers to execute financial transactions and carries the highest risk. (e.g., performing a financial transaction, such as an account-to-account transfer, paying a bill, wire transfer, and applying for a loan or a new account)

**Other features:** The other features are electronic presentment and payment of bill; funds transfer between a customer own checking and savings accounts or to another customer account; investment purchase or sale; loan applications and transactions such as repayment of loan; non-transactional (e.g., issue of on-line statements, check links, co-browsing, and chat); bank statements; financial institution administration; support of multiple users having varying levels of authority; transaction approval process; personal financial management support such as importing data into personal accounting software. Some on-line banking platforms support account aggregation to allow the customers to monitor their accounts in one place whether they are with their main bank or with other institutions (Ashutosh Saxena, 2003; Bikramjit Singh Mann, et al., 2007; Poolad Daneshvar et al., 2010; Bhasin T.M., 2001).

Customers could check out their account details; get their bank statements; perform transactions like transferring money to other accounts; pay their bills sitting in the comfort of their homes and offices (Ashok Singh, 2010; Savita Trivedi, et al., 2010). IB offers wholesale products and services include cash management, wire transfer and bill presentment and payment. Examples of retail products and services include balance inquiry, funds transfer, downloading
transaction information, bill presentment and payment, loan applications, investment activity, and other value-added services (Ashutosh Saxena, 2003; Swati Anand et al., 2009). IB allows banks to offer ancillary services such as insurance, brokerage services, and mortgage payments through their web site. Such services are offered either directly or through a partner firm (Ravi Nath, et al., 2001).

### 3.2.4.6 Primary drivers

The primary drivers of IB are improving customer access, facilitating the offering of more services, increasing customer loyalty, attracting new customers, providing services offered by competitors and reducing customer attrition (Mishra A.K., 2005).

### 3.2.4.7 Benefits to customer

The customers can have access to IB twenty four hours a day (Ashok Singh, 2010; Savita Trivedi, et al., 2010; Sourabh Sharma, et al., 2010-11) and seven days a week. IB Increases customer convenience (Parasuraman A., et al., 1991; Bhasin T.M., 2001). It reduces personal visit to the branch. IB is the best example of anytime, anywhere banking (Poolad Daneshvar, et al., 2010). The customers no longer have to wait in long queue to get the transactions completed. It saves time (Parasuraman A., et al., 1991). IB defies geographic boundaries (Ramachandra Rao Gurram, 2003). It is cheaper than physically going to the bank branch. IB provides customized information to suit the needs of the user. A multitude of different banking products and services are provided to the customers. Cost of transactions through IB is much lesser (Sourabh Sharma, 2010-11; Bhasin T.M., 2001) than any other traditional/electronic mode (Bikramjit Singh Mann, et al., 2007; Ramachandra Rao Gurram, 2003). IB saves on travel and time (Raja Simhan T. E., 2004).

### 3.2.4.8 Benefits to banks

Banks don’t have to issue and update software packages for all their customers pcs. IB enables customers to conduct banking transactions from anywhere in the world with an Internet connection. IB transactions are a lot cheaper. The Internet doesn’t have a central switch whose owner can charge banks a fee for every transaction. Web-based service is the paradigm that banking will take
into the next century (Bill Orr, 1998). IB is perceived as more favorable by banks. IB allows banks to offer ancillary services such as insurance, brokerage services, and mortgage payments through their website. Such services are offered either directly or through a partner firm (Ravi Nath, et al., 2001). IB reduces the costs of operation (Bhasin T.M., 2001) resulting in savings in expenditure and increasing the revenue. It not only increases the customer base but also makes them more committed towards the bank by providing different products and services in time, to its potential users. It creates competitive advantage.

IB facilitates interactivity between the bank and customer resulting to nurture long-term relationships in such a way that it enhances customer trust and loyalty towards the bank (Kavitha Venkatachari, 2009-10). IB makes for quick transfer of money and goods (Bhasin T.M., 2001). Online banking offers extensive ranges of products and services to national or even global customer bases. It can track consumer demand patterns much more broadly and precisely than traditional banking can (Darrell K. Rigby, et al., 2006). Requirement of staff at the banks get reduced. IB opens new VISTAS for providing efficient, economic and convenient service to the customers. IB creates strong basic infrastructure for the bank to venture in the new fields like E-Commerce, EDI etc. (Ramachandra Rao Gurram, 2003).

3.2.4.9 To become as an Internet banking customer

First Name, Middle Name, Last Name, Customer ID (can be found in account savings book and cheque book, or can be obtained from bank if it is unknown), Branch Name, Signature and Application Date and Email Address. Customer should know about ‘Option View’ and ‘Funds Transfer’ (if all fund transfer facilities are required). Customer should choose ‘View Only’ (if fund transfer facilities are not required).

3.2.4.10 Mechanism

IB enables customers to perform transactions using PC/Laptop at anytime anywhere. In general the steps (Gurusamy S., 2006) involved in proceeding and completing transactions are accessing bank’s website followed by clicking on the option which provides IB, entering User-ID, Password/PIN, performing the requisite
transactions and then finally Logging out safely. This mechanism slightly differs from bank to bank (Concerned bank’s websites; kannanpersonnal.com, 2004).

### 3.2.4.11 Internet penetration – Internet banking

Bughin (2001) through a statistical analysis reveals that when a country achieves the Internet penetration rate of above 30%, the use of IB products and services will start increasing disproportionately. This conclusion is true for the Middle East region, Sweden, Finland (Suman Lodh et al., 2008; Rupa Rege Nitsure, 2003-2004), Norway, Spain, France, Portugal and Islamic countries. Whereas the US (Rupa Rege Nitsure, 2003-2004), Korea, and Switzerland where the IB diffusion rates are low despite high Internet penetration rate (Suman Lodh et al., 2008).

According to acnienlsen’s study (2002) on ‘South Korea, Hongkong, Singapore, China, and Tiwan’ South Korea has the largest number of online banking consumers around 63%, followed by China and Taiwan. Guru et al., (2003) found almost all domestic banks in Malaysia are offering full IB services in 2003. The foreign and private banks in India are much advanced in terms of the number of sites and their level of development. Several studies on diffusion of IB services in India predicted a highly sophisticated and competitive IB market that would emerge in the coming years. In Japan, the revolution started in 2000, as Japan Net Bank (JNB) started without a physical branch. In 2001, Sony started Sony Bank as a second online bank in Japan. Another bank named E*tradebank has become the world’s largest Internet bank (Suman Lodh et al., 2008).

Several studies, like acneilsen (2002), reveal that the use of the IB is increasing in the Asian countries but it is still not getting the acceleration. Jarrah, (1999) says that the total number of users in 13 Arab countries was close to one million in April 1999. Egypt ranked highest in terms of users followed by UAE, Saudi Arabia, Kuwait, and Jordan. Jarrah argues that the growth percentages in this industry are very impressive and are expected to spur the development of electronic business and other online services in the region (Suman Lodh et al., 2008). A preliminary analysis by Nsouli and Schaechter from International Monetary Fund (IMF) shows that IB is particularly widespread in Austria, Korea, the Scandinavian
countries, Singapore, Spain and Switzerland, where more than 75 per cent of all
banks offer such services (Rupa Rege Nitsure, 2003-2004).

3.2.4.12 Emerging challenges before the customers to adopt Internet banking

The basic infrastructure like uninterrupted clean power supply, no
network problem (Sakthivel N., et al., 2009-10, Bhasin T.M., 2001), risk free
(Bhasin T.M., 2001), communication media, technical backup services, sufficient
menu for transaction, variety of services readily accessible, availability for business
and having a user-friendly system (Poolad Daneshvar, et al., 2010), requisite skills,
knowledge (Srinivasa Rao J., 2004; Sakthivel N., 2009-10; Sudipkar Purkayastha,
2010) and self-efficacy, Internet proficiency, computer knowledge (Compeau D.R.,
et al., 1995; Hong W., et al, 2001; Agarwal et al, 2000; Chau, 2001; Prema C.,
et al., 2010) are still far away from quite a good number of not only rural centres but
also metro centres (Srinivasa Rao K., 2008).

IB has failed to take off due to a combination of psychological, legal and
technological and socio-economic factors. Lack of critical mass of early adopters,
lack of a strong trust environment, slowness in adoption of the internet, low
penetration of pcs (Bhasin T.M., 2001; kannanpersonnal.com, 2004) and access to
internet are some of the impediments in the adoption of IB in India (Vepa Kamesam,
2004).

Raopun (2005) in his paper evaluated the level of IB services in Thailand
and compared the overall service quality of IB and found that reliability, security
system and information accuracy was the most important perspectives and least
important was the perceived quality of commercial bank (Manjit Singh, et al., 2009).
Customer service is important to a company’s brand. The personal experience with a
company’s site is important for customers perceptions on security
(Bhasin T.M., 2001; Raja Simhan T. E., 2004; Black N.J., 2001), quick service, trust
(Amit Kumar Chaturdevi et al., 2009).

There is a need for secured (Ahmad Khasawneh, et al., 2009), low cost
and easily usable anti-phising solution to curb phishing. Another need is motivation
of more number of people to bank online (Balaraju K., et al., 2008). The
phenomenal growth of the Internet has spawned several new concerns about protecting the privacy of consumers (Raja Simhan T. E., 2004). The biggest threat to online banking/e-commerce is the threat of phishing. According to a study by Gartner, phishing on Internet in India has increased by a whopping 800 percent in the period from April 2003 to May 2007 – indeed a worrying factor for bankers and customers (Balaraju K., et al., 2008).

### 3.2.4.13 Safety guidelines

To protect ID and password from being stolen and misused, one should practice/adopt the following: Bank account through cyber cafes is never to be accessed; ID and password are never to be shared with any person; password is to be changed at periodical intervals; password is to be coined with a length of 6-8 characters using combination of small letters, capital letters, numerical and special characters like .%^/ etc., home PC is to be updated with latest antivirus software and in case of any unusual pop ups get PC checked for virus before accessing account; screen savers etc. Downloading from free download sites should be avoided.

As far as possible, IB facility with banks which offer virtual keyboard should be used. That is, some banks offer virtual key board to click user ID and password on the screen using the mouse and not keyboard. This cannot be detected by the spy ware. If all spy ware is there in the system, the request supposed to have come from the bank to share password and ID should never be responded. It should be remembered that no bank will ask the customers to share their ID and password for any reason. It requires regular virus scans and other common sense elements such as not using public computers to conduct banking activities, not to access link provided in the mails to provide data. It cannot be known to whom the information is provided. When accessing the bank’s site we should look for security – the lock on the status bar which signifies that the web site is secured or any other security logo like Veri Sign etc.

It is so easy to transact with banks by accessing from the comfort of our home at our convenient time. Even then we should be aware of the risks and also adhere to the above precautions. These precautions are equally applicable to any
transactions dealt on the Internet, be in bank account, on line trading or accessing DP account on line etc. (Ramachandra B.S., 2007).

3.2.4.14 Electronic payments through Internet banking services

Payment systems are important for economic growth and they are evolving – largely driven by innovation, convenience and economic benefits. Efficiency in payment systems in general and electronic payment systems in particular, benefits every customer and paves for the country’s economic growth. The electronic payment system evolution can be traced back to the 1950s with the introduction of ERMA (Electronic Record Method of Accounting) and MICR based cheque-clearing systems in the USA. In India, implementation of MICR based clearing took place in 1986. The technological infrastructure created by the IDRBT since the establishment of the INFINET in 1999. This was aimed at sharing expensive IT resources so as to achieve the economies of scale. One of the no achievements of the IDRBT has been the implementation of Public Key Infrastructure (PKI) electronic based data transfer with very high security levels (Malyadri P., et al., 2008; Balakrishnan M., 2007; Reddy Y.V., 2006).

Reserve Bank’s Initiatives for Electronic Payments and Banking: As part of RBI’s public policy objective of promoting a safe, secure, sound and efficient payment system, the Reserve Bank has introduced the ECS and the EFT system in 1995, the RTGS system in March 2004, the NEFT system in November 2005 and CTS in February 2008 (Leeladhar V., 2008).

The total turnover under various payment and settlement systems, in terms of both value as well as volume, exhibited a steady growth during the year 2011-12. In terms of volume, a growth of 9.1 per cent and in value terms 7.6 per cent was registered. The electronic payment systems such as ECS credit and debit, NEFT for retail transactions and RTGS for large value, improved the speed of financial transactions, across the country. Both retail and large value systems of electronic payment transactions registered a growth out of which NEFT registered a steep growth in 2011-12 over the previous year (www.rbi.org.in).
The Reserve Bank has implemented CTS in the National Capital Region (NCR), New Delhi and Chennai with effect from February 1, 2008 and September 24, 2011 respectively. All banks providing cheque facility to their customers have been advised to issue only 'CTS-2010' standard cheques not later than April 1, 2012 on priority basis in northern and southern region which will be part of the northern and southern CTS grids respectively and across the country by September 30, 2012 through a time bound action plan. The benefits from CTS are shorter clearing cycle, superior verification and reconciliation process, no geographical restrictions as to jurisdiction, operational efficiency for banks and customers alike and reduction in operational risk and risks associated with paper clearing (Balakrishnan M., 2007; http://www.rbi.org.in/scripts/faqview.aspx?Id=63).

3.3 MOBILE BANKING

Mobile commerce is defined as the delivery of trusted transaction services over mobile devices, for the exchange of goods and services between consumers, merchants and financial institutions has emerged as one of such options. Thus, MB as one of the ‘Branchless banking’ is emerged as the next big channel to the IB (Anurag Khanna, 2006). Given the convenience and the number of mobile phone users in India, MB is bound to pick up (Dhamodaran R., 2010). MB is actually a graduation from ATM, both of which, with adequate security measures, are going to revolutionise the bank concept (Raghavan R.S., 2010).

Phone banking/MB is a technology-enabled service provided by banks that allows customers to perform selected banking transactions over a telephone/mobile phone using SMS. It uses an interactive voice response (IVR) to respond to the customer. MB involves the relationship between the bank, the mobile network operator and third party intermediaries (Nidhi Choudhari, 2009; Amrit Patel, 2010). Some of the banks started offering personalised MB services by installing the specific software application provided by them on GPRS enabled mobile handsets. MB facilitates the bank to cross-sell up their other complex banking products and services such as vehicle loans, credit cards, etc.
3.3.1 Need and Scope

India stands 29 in a list of 55 countries based on the country’s performance in banking penetration, availability of the banking services, and the usage of the banking system (Martina Rani K., 2010). Over the past few years, the mobile telephony and wireless market (Harilal R., et al., 2011) has been one of the faster growing markets in the world, especially in Asian countries such as China, Indonesia, India and Philippines (Ashish Srivastava, 2008). There has been explosive growth in mobile usage in most Asian economies like India, China and Korea. Korea boasts of about 70 percent mobile penetration and it has seen one of the most aggressive rollouts of MB services (Ashok Singh, 2010).

According to a new study ‘India Mobile Market Statistics, 2002-2011’ conducted by the Centre for Telecoms Research (CTR), London, expresses that mobile phone connections in India are expected to reach the level of 60 crore by the year 2011 with easily affordable handsets, lower tariffs and better network coverage (Ashish Srivastava, 2008). According to the Cellular Operators Association of India (COAI), the mobile subscriber base in India crossed 258 million in 2008. Approximately, another 10 million mobile users are being added to this every month. Given that mobile phones in India have now become more affordable, MB can be a powerful tool to bank the un-banked population (Ashok Singh, 2010).

According to the GSM association and Ovum, the number of mobile subscribers now exceeds 2.5 billion (of which more than 2 billion are GSM). According to a study by financial consultancy Celent, upwards of 70% of bank center call volume is projected to come from mobile phones. Another study from 2010 by Berg Insight forecasts that the number of MB users in the US will grow from 12 million in 2009 to 86 million in 2015. The same study also predicts that the European market will grow from 7 million MB users in 2009 to 115 million users in 2015 (Harilal R., et al., 2011).

3.3.2 Evolution

MB was introduced almost simultaneously in both USA and India (Sudipkar Purkayastha, 2010). In 2007 and 2008, MB users have been recorded three fold increase across the world (Dipanwita Dutta, 2010). Putting in place a s
Unique Identification Number for the growing Indian populace would enable reaching and streamlining of banking through financial inclusion (Raghavan R.S., 2010). ABSA was one of the first banks in South Africa to introduce m-banking in 2002. Its customers use the mobile phone as a complementary channel of the bank sought to integrate the Mobile and Internet channels and has introduced a Short Message Service (SMS) mechanism to alert customers as a security precaution.

Equity Bank in Kenya created two new banking channels in addition to a regular branch. They are i) Through ATMs and mobile vans and ii) Mobile phone channel. The MB channel enables customers to check their account balances, remit funds, and to do similar other transactions. Customers at their convenience cash-in or cash-out at agents, branches, ATMs or mobile vans as well as use both the mobile phone and card-linked facilities for financial transactions. Migrants use mobile phones frequently to send small amounts of money to home (Amrit Patel, 2010).

TMB launched its m-banking services on its own without any existing m-banking infrastructure partner in Pakistan (Amrit Patel, 2010). 52 banks have been approved by RBI to commence MB services. Presently, 17 non-banks including a mobile service provider and a mobile phone company are authorised to issue prepaid payment instruments, including mobile-wallets. Fund transfers from these instruments have been permitted albeit in a limited way to enable money transfers by the domestic migrant population to their families (Chakrabarty K.C., 2011).

While TMB in Pakistan was bought by an MNO and launched easy paisa, the 60 rural banks in the Phillipines joined together and helped to create the agent network for gcash, a service by an MNO. Opportunity Bank in Malawi introduced the m-banking service (called Bankimnja or ‘bank in your hand’) involving its staff, it was launched in May 2010. While the banks was developing its m-banking, MNO Zain (which was present already in other African countries) announced the launch of its m-banking service called Zap with a larger agent network than the Opportunity Bank network. Opportunity Bank may eventually link into this system to gain access to more agents and remain competitive. WING Cambodia, sponsored by ANZ Bank and launched in January 2009 is a new
m-banking service with over 100,000 customers. BRAC, one of the largest MFIs and industry leaders in Bangladesh is considering the role of an agent for an established m-banking provider (Amrit Patel, 2010).

3.3.3 Concepts

MB can be said to consist of three inter-related concepts. They are mobile accounting, mobile brokerage and mobile financial information services. The accounting and brokerage services are therefore, offered invariably in combination with information services. Information services, on the other hand, may be offered as an independent module. Presently, this service is available on GSM handsets (Selvakumar M., et al., 2010; Harilal R., et al., 2011; Ashok Singh, 2010)

3.3.4 Business Models

Branchless banking/MB is pursued in India through both bank-led and non-bank-led models.

Bank Focused/ Bank Led Model

A traditional bank uses branches, bank employees, extension counter and ATM non-traditional low-cost delivery channels to provide banking services to its existing customers. Of these ATM approach is more capitalised by the PRSBs. MB provides certain limited bank services to bank’s customers (Devaprakash R., 2008; Harilal, et al., 2011 Ashish Srivastava, et al., 2008). The bank-led model is implemented by either using correspondent arrangements or by creating a Joint Venture between Bank and Telco/non-bank. In this model customer account relationship rests with the bank (Dipanwita Dutta, 2010).

Non-Bank Led Model

This model provides banking services to the customers with the aid of his/her handset instead of bank branches. It ensures more client outreach through various innovative models and products designed by banks. Business correspondent model, business facilitator model, POS machines and smart-cards are some instruments to ensure wide reach of financial services. The new generation PRSBs
pursue this model to overcome the deficiency of physical presence of branches
(Devaprakash R., 2008; Harilal, et al., 2011 Ashish Srivastava, 2008). The Non-
Bank-Led Model is the one, where a bank does not come into the picture (except
possibly as a safe-keeper of surplus funds) and the non-bank (e.g. Telco) performs
all the Functions (Dipanwita Dutta, 2010).

These have been depicted in the following Figure 3.1.

![Figure 3.1 Business Models](image)

Protagonists of the Non-bank led model referred to the success of such
models in a few countries like Kenya and Philippines. While acknowledging that the
MB models in these countries were perhaps the appropriate solution in the
respective jurisdictions, we, in India, opted for the Bank-led model. It is perhaps this
model which has the capability to deliver the minimum of four basic products and
services viz. A savings account with overdraft facility, a remittance product, a pure
savings product, preferably variable recurring deposit, and an entrepreneurial credit
product which in our perception are minimum qualifying products, that any financial
inclusion model should contain (Chakrabarty K.C., 2011).

3.3.5 Technologies

Technically MB services can be deployed using mobile applications
developed on any one of the four channels namely, Interactive Voice Response
(IVR), Short Messaging Service (SMS), Wireless Access Protocol (WAP), Standalone (client-based) mobile application clients (Ashok Singh, 2010).

3.3.6 Mechanism

MB mechanism slightly differs from bank to bank. However in general, majority of MB customers follow the mechanism of how the paymate works as detailed below. Customer gets into an e-commerce site that has integrated the paymate system into its payment gateway. Customer chooses the products and proceeds to check out, where he/she chooses to pay by mobile, from among other payment options. He will be asked to type his mobile number, and will receive instructions on the screen and an SMS on his phone, asking him to confirm/authorise the payment. He acknowledges the payment by sending an SMS with the amount and PIN (provided by the bank) to a specified short code. The bank then sees the transaction through. He will receive a confirmation through SMS and also see a confirmation on the screen. The same SMS payment module can also be adapted to accept payments on the telephone (at a call centre) or through an Interactive Voice Response System (IVRS).

Currently, the service is available for Citibank account holders. They need to register with the bank for mobile payment and will be given a mobile PIN to authorise transactions. “paymate was initially launched with Citibank and is now connected to 13 other leading banks, says Ajay Adiseshan, founder of paymate (Janani Gopalakrishnan, 2007). MB is helpful to conduct Inter-bank transactions with the help of MPIN and Mobile Money Identifier (MMID). Few banks enable customers to use their mobiles to make EFT on prepaid basis (Dhinathanthi, 2013).

3.3.7 Services - Taxonomy of Mobile Banking Services

Based on the originator of a service session m-banking services have been categorized as “Push/Pull”. The other way to categorize the MB services, gives us two kinds of services namely Transaction based and Enquiry based. These have been depicted in the following.
Table 3.1 Taxonomy of Mobile Banking Services

<table>
<thead>
<tr>
<th>Kinds</th>
<th>Push</th>
<th>Pull</th>
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<td>Transaction</td>
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<td>• Fund Transfer</td>
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<td>• Bill Payment</td>
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<td></td>
<td></td>
<td>• Other financial services like share trading</td>
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<tr>
<td>Enquiry</td>
<td>• Credit/debit alerts</td>
<td>• A/c bal enquiry</td>
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<td>• Min balance alerts</td>
<td>• A/c statement enquiry</td>
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<td></td>
<td>• Bill payments alerts</td>
<td>• Cheque status enquiry</td>
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<td>• Cheque book enquiry</td>
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<td></td>
<td></td>
<td>• Recent transaction enquiry</td>
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<td></td>
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<td>• Location of the nearest ATM/branch</td>
</tr>
</tbody>
</table>

(Dhamodaran R., 2010; Jayasree Menon, 2008; Nagaraju Y., et al., 2008; RBI, 2010)

3.3.8 Service Categories

MB Services (Harilal R., et al., 2011) are broadly categorized as explained below.

Account Information (Transaction Based Services)

There are many Transaction Based Services viz., mini-statements and checking of account history; alerts on account activity or passing of set thresholds; monitoring of term deposits; access to loan statements, access to card statements; mutual fund/equity statements; insurance policy management; pension plan management; status on cheque, stop payment on cheque; ordering cheque books; balance checking in the account; recent transactions; due date of payment (functionality for stop, change and deleting of payments); PIN provision, change of PIN and reminder over the Internet; blocking of (lost, stolen) cards.

Payments, Deposits, Withdrawals and Transfers

These services include domestic and international fund transfers, micropayment handling, mobile recharging, commercial payment processing, bill payment processing, peer to peer payments, withdrawal at banking agent and deposit at banking agent.
**SMS Messages (Enquiry Based Services)**

Enquiry based services enable the system to verify if the client has sufficient funds in customer’s wallet; Enable to authorise a deposit or withdrawal transaction the agent; when depositing money, the merchant receives cash and the system credits the client’s bank account or mobile wallet; enables client to withdraw money at the merchant: through exchanging SMS to provide authorisation, the merchant hands the client cash and debits the merchant’s account; activate alerts, if a threshold limit is crossed; sets a minimum balance alert.

**Investments**

Investment services include portfolio management services; real-time stock quotes; personalised alerts and notifications on security prices; MB.

**Support**

The various supporting services are status of requests for credit, including mortgage approval, and insurance coverage; check (cheque) book and card requests; exchange of data messages and email, including complaint submission and tracking; ATM locations.

**Content Services**

These services include general information such as weather updates, news; loyalty-related offers; location-based services (Harilal, et al., 2011; Savita Trivedi, et al., 2010).

**3.3.9 Applications**

The applications are M-payments(B2C) & Inter-personal(P2P) payments, card based payments(Mobile debit/credit/pre-paid card), cash payments(electronic purse/wallets), utility bill payments, credit card payment, mobile Top up, alerting services (transaction alerts, reminders, stock alerts, offers & marketing promotions). It also offers mobile solutions for personnel servicing business customers such as mobile credit approval, mobile insurance assessment, mobile collections, etc. (Dipanwita Dutta, 2010; Savita Trivedi, et al., 2010).
3.3.10  Present Scenario of Mobile Banking in International Level

In the world of m-banking, leading the way is Philippines, with over 3.5 million users split between G-CASH and the competitor SMART money. In case of South Africa, the MTN MB and WIZZIT are operating successfully. In Brazil, m-banking is expected to surpass the IB in another five years. Kenya is also joining the fray with M-Pesa. With 40 percent mobile phone users, the m-banking has become a phenomenal success in Philippines (Ashish Srivastava, 2008). Mobile service providers like Vodafone, Airtel and Tata Telecom, driven by international experience in countries like Latin America, Africa and the Philippines have already explored the feasibility of offering financial services in India (Amrit Patel, 2010).

The company WIZZIT, a division of the South African Bank of Athens since its launch in December 2004 is a start-up m-banking provider that offers a transaction banking account accessible via mobile phones and debit cards. Customers can use their mobile phones to make person-to-person payments, transfer money, bill payments, balance checks, etc. Customers can purchase prepaid electricity card and can buy airtime for a prepaid mobile phone subscription. It also promotes WIZZIT as ‘the easy way to pay’ for customers who want to avoid carrying cash and the inconvenience of long queues at utility offices (Ashish Srivastava, 2008). Besides, account holders are also provided a Maestro card for cash withdrawal. The msps supports this facility as carriers of such transaction instructions (Dipanwita Dutta, 2010).

The MB is one of the newest approaches to the provision of financial services through Information communication technology (ICT), made possible by the widespread adoption of mobile phones even in developing countries like Kenya, Philippines and India, and under developed countries like South Africa (Martina Rani K., 2010).

MB helped the drive for financial inclusion in a great way. MB has come in handy in many parts of the world with little or no infrastructure development, especially in remote and rural areas. This is also very popular in African countries like Kenya, Zambia, South Africa and Philippines where most of their population is unbanked. Countries like Sudan, Ghana and South Africa received Mobile
commerce very well. In Latin America countries like Uruguay, Paraguay, Argentina, Brazil, Venezuela, Colombia, Guatemala and recently Mexico started with a huge success. South Korea is showing the way in terms of the evolution of services being offered on mobile applications. The big push came when LG Telecom Ltd., teamed up with the Kookmin bank to launch the ‘bank on’ service. In Iran banks like Parsian, Tejarat, Mellat, Saderat, Sepah, edbi and bankmelli offer this service. Guatemala has the support of Banco industrial. Kenya’s Safaricom (part of the Vodafone Group) had the very popular M-Pesa Service – mainly used to transfer limited amounts of money, but has been increasingly used to pay utility bill, Zain in 2009 launched their own mobile money transfer business known as ZAP in Kenya and other African countries (Harilal R., et al., 2011).

3.3.11 Present Scenario of Mobile Banking in India

Banks wishing to provide MB services could seek prior one time approval of the RBI, by furnishing full details of the proposal (Jayasree Menon, 2008). Adoption percentage of MB in Indian banking scenario by co-op Banks, PSBs, Foreign banks and PRSBs are 9%, 22%, 30% and 39% respectively (Srinivasan G., et al., 2006). Currently, in India, 134 million households are financially excluded, which is 60 percent of the country’s population. Moreover, financial exclusion in urban India is about 44 percent whereas exclusion in rural India is about 76 percent (Ashok Singh, 2010).

MB in India is set to explode – approximately 43 million urban Indians used their mobile phones to access banking services during quarter ending August 2009, a reach of 15% among urban Indian mobile phone user. ICICI bank maintains its position as country’s biggest private lender on mobile screen as well with 17.75 million users. HDFC accounts for second most subscribers with 9.1 million subscribers followed by State Bank of India with 6.13 million subscribers (Dhamodaran R., 2010). The volume of MB transactions in July 2011 was 1.74 million with a value of Rs. 1.51 billion, an increase of 223 per cent over the position in July 2010 (Chakrabarty K.C., 2011).
3.3.12 Mobile Banking Transaction Limit

MB transaction limit rose. Responding to banks petitions, the RBI has raised the transaction limit for MB to Rs. 50,000/- a day. This will enable customers to transfer Rs. 50,000 per day through their mobile phones as well as to buy goods and services for the same amount. (RBI., 2010; Raghavan R.S., 2010; Dhamodaran R., 2010; Anonymous, 2010).

3.3.13 Benefits to Customers

International: bancosol, a leading microfinance Bank in Bolivia, whose 400,00 customers who used their mobile phones to MB is used to check account balances, receive details like date and amount of next loan repayment and to transfer funds from one account to another. It reduces costs to $1/3$rd to $1/4$th of a conventional bank, time and phone bills through automatic text messages (Amrit Patel, 2010). MB offers the customer ubiquitous, immediate, localised, instantaneous, ability to conduct a financial transaction by simple authenticative methods with less cost (Srinivasan G., et al., 2006; Ivatuary et al., 2008). MB leads for better staff utilisation. Mobile banks come handy. The area of coverage is larger. The bank can move from one place to another place (Bhasin T.M., 2007). It ensures fast process. It provides real time information. Transactions can be easily monitored. Any error in transactions or any unauthorised transactions can be easily detected. It is a revolutionary service, which saves valuable time, money, and movement. At the same time, it creates value. It is the next surest way to achieve growth in the overall economy of our country (Savita Trivedi et al., 2010). It offers convenience in transactions only with cell phone and without use of PC (Resmi Jaimon, 2008). It enables transactions without risks associated with the use of cash, including theft and cost of travel to pay in person. Moreover, m-banking provides the customers the facility of a 24x7 virtual bank (Ashish Srivastava, 2008). The speed and efficiency through m-banking is likely to be far greater and higher as compared to the existing systems. Registration with the bank is free and the payment per transaction is merely that of a premium SMS (Janani Gopalakrishnan, 2007). MB is inexpensive, ease of operation, mobility for the customers (Dipanwita Dutta, 2010; Savita Trivedi, et al., 2010). As per RBI guidelines, the banks will be
responsible as principals for all acts of omission and commission of their agents (Anonymous, 2010).

### 3.3.14 Benefits to Banks

MB helps banks to increase penetration; sell more services; retain the most valuable customers; reduce the service cost; gain customers from competition; increase market share; bring the unbanked into the economic mainstream. It reduces their operating costs (Ivatuary et al., 2008; Ashish Srivastava, 2008; Dipanwita Dutta, 2010; Savita Trivedi et al., 2010). Eliminates the need for costly call centres and customer service; SMS text messaging reduces the burden on IT and personnel resources; Reduces the errors associated with paper-based payments. It can be observed from the experiences of the MB services M-Pesa of Kenya, G-Cash of Philippines, Wizzit of South Africa, the saving in the costs of microfinance loans to rural poor. It provides a new avenue for selling their products like insurance packages and other banking services. MB provides banks an opportunity to further augment their customer base by reaching the ‘un-banked’ community besides providing an additional alternative banking channel and a value-added service to their existing customers (Ashish Srivastava, 2008). MB through an SMS-based service would require the lowest amount of effort, in terms of cost and time, but will not be able to support the full breadth of transaction-based services (Ashok Singh, 2010). MB services are secured and easy to integrate. Inter-Bank Mobile Payment System (IMPS) which provides a centralised interoperable infrastructure and enables money transfers between customer accounts in different banks through mobile phones in real time. This service rides on the existing National Financial Switch (NFS), Inter-bank ATM transaction, switching infrastructure and message format-and, hence, easy for banks to adopt (Dhamodaran R., 2010).

### 3.3.15 Benefits to Government

MB enables the Government to achieve the inclusive growth and to reach those people for making the payment under the Government schemes such NRGI, Pension payments (Dhamodaran R., 2010; Ashish Srivastava, 2008), etc.
3.3.16 Benefits to Mobile Network Operators

As the coverage of mobile networks increases and the cost of handsets falls, owning a mobile phone and using it for financial transactions will become increasingly feasible for poorer people in even remote locations. This helps to maintain widespread network, such as Very Small Aperture Terminal (VSAT) (Ashish Srivastava, 2008).

3.3.17 Benefits to Society

MB has a great potential in bridging the economic divide given its mass appeal, mobile payments are accepted with greater ease in comparison to any other form of e-money. It minimizes the usages of cash. It helps in moving towards a greener society (Ashish Srivastava, 2008).

3.3.18 Challenges

The following are the challenges of MB solution

**Inter Operability:** There is a lack of common technology standards for MB. Many protocols are being used for MB – HTML, WAP, SOAP, XML to name a few. It would require either the application to support multiple protocols or use of a common and widely accepted set of protocols for data exchange. There are a large number of different mobile phones devices and it is a big challenge for banks to offer MB solution on any type of device. Some of these devices support J2ME and others support WAP browser or only SMS. Overcoming interoperability issues however have been localised, with countries like India using portals like R-World to enable the limitations of low end java based phones, while focus on areas such as South Africa have defaulted to the USSD as a basis of communication achievable with any phone. The desire for interoperability is largely dependent on the banks themselves, where installed applications (Java based or native) provide better security, are easier to use and allow development of more complex capabilities similar to those of IB while SMS can provide the basics but becomes difficult to operate with more complex transactions. In practice, banking interfaces are well defined and money movements between banks follow the ISO-8583 standard.
Security: Security of financial transactions, being executed from some remote location and transmission of financial information over the air, is the most complicated challenges that need to be addressed jointly by mobile application developers, wireless network service providers and the banks IT departments.

As a measure, to offer a secure infrastructure for financial transaction over wireless network: physical part of the hand-held device is necessary. If the bank is offering smart-card based security, the physical security of the device and security of any thick-client application running on the device are more important; In case the device is stolen, the hacker should require at least an ID/Password to access the application; Authentication of the device with service provider before initiating a transaction; This would ensure that unauthorised devices are not connected to perform financial transactions; User ID/Password authentication of bank’s customer; Encryption of the data being transmitted over the air; Encryption of the data that will be stored in device for later/off-line analysis by the customer.

Application distribution: Due to the nature of the connectivity between bank and its customers, it would be impractical to expect customers to regularly visit banks or connect to a web site for regular upgrade of their MB application. It will be expected that the mobile application itself check the upgrades and updates and download necessary patches (so called Over the Air updates). However, there could be many issues to implement this approach such as upgrade/synchronization of other dependent components.

Personalisation: It would be expected from the mobile application to support personalisation such as: Preferred Language; Date/Time format; Amount format; Default transactions; Standard Beneficiary list; Alerts; Cell phone redirects here. For the movie, see Cell Phone (film) (Selvakumar M., et al., 2010; Savita Trivedi et al., 2010; Dipanwita Dutta, 2010).

Scalability: The transaction cost involved in the MB financial services is the main focus for banks and MFIs to render MB service to the rural poor and for the lower transaction cost. Scalability is another factor to be focused which is the result of faster customer adoption (Martina Rani K., 2010).
3.4 SUMMARY

This chapter provided an overview on selected E-banking channels namely ATM, IB and MB services. The evolution, features, scenario, benefits, mechanisms and preventive measures to be adopted by customers against frauds pertaining to these services have been provided on the basis of reviews made. The analysis and discussions on the data based on the demographic profile and on the awareness level of customers on the core banking system (CBS) are provided in the next chapter.
Chapter 3 - References


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